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EXAMINER	
CHAKRABARTI,A	
ART UNIT	**PAPER NUMBER**
1655	9

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Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.	Applicant(s)
09/341,641	Schmidt et al.
Examiner	**Group Art Unit**
Arun Chakrabarti	1655

☒ *Responsive to communication(s) filed on* Oct 12, 2000 .

☐ *This action is* **FINAL.**

☐ *Since this application is in condition for allowance except for formal matters,* **prosecution as to the merits is closed** *in accordance with the practice under Ex parte Quayle, 1935 C.D. 11; 453 O.G. 213.*

A shortened statutory period for response to this action is set to expire 3 *month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).*

Disposition of Claims

☒ *Claim(s)* 21-39 and 41-43 *is/are pending in the application.*

Of the above, claim(s) _____ *is/are withdrawn from consideration.*

☐ *Claim(s)* _____ *is/are allowed.*

☒ *Claim(s)* 21-39 and 41-43 *is/are rejected.*

☐ *Claim(s)* _____ *is/are objected to.*

☐ *Claims* _____ *are subject to restriction or election requirement.*

Application Papers

☐ *See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.*

☐ *The drawing(s) filed on* _____ *is/are objected to by the Examiner.*

☐ *The proposed drawing correction, filed on* _____ *is* ☐*approved* ☐*disapproved.*

☐ *The specification is objected to by the Examiner.*

☐ *The oath or declaration is objected to by the Examiner.*

Priority under 35 U.S.C. § 119

☐ *Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).*

☐ *All* ☐ *Some** ☐ *None of the CERTIFIED copies of the priority documents have been*

☐ *received.*

☐ *received in Application No. (Series Code/Serial Number)* _____ .

☐ *received in this national stage application from the International Bureau (PCT Rule 17.2(a)).*

**Certified copies not received:* _____ .

☐ *Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).*

Attachment(s)

☐ *Notice of References Cited, PTO-892*

☐ *Information Disclosure Statement(s), PTO-1449, Paper No(s).* _____

☐ *Interview Summary, PTO-413*

☐ *Notice of Draftsperson's Patent Drawing Review, PTO-948*

☐ *Notice of Informal Patent Application, PTO-152*

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 21-39 and 41-43 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 21 and 33 are rejected over the recitation of the phrase, "same reaction zone". It is not clear whether particular common sequence on plurality of DNA templates where hybridization reaction takes place is claimed or the zone of immobilization reaction by which the single stranded nucleotides are attached on one end to the solid support is claimed. The metes and bounds of the claims are vague and indefinite.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless --
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 21-32 are rejected under 35 U.S.C. 102 (b) as anticipated by Southern et al. (PCT International Publication Number: WO 95/04160) (February 9, 1995).

This rejection is based on the assumption that "same reaction zone" means common sequence on plurality of DNA templates where hybridization reaction takes place.

Southern et al. teaches a method for sequencing DNA (Abstract with Figure), which comprises:

(a) obtaining a target DNA population comprising a plurality of single-stranded DNAs to be sequenced, each of which is inherently present in a unique amount in the same reaction zone and bears a primer to provide a double-stranded portion of the DNA for ligation thereto (Figure 5 and Example 16 b, lines 1-12 and Claims 16 a and 16 b);

(b) contacting the DNA population with an array of hybridization probes, each probe comprising a label cleavably attached to a known base sequence of predetermined length, the array containing all possible base sequences of that predetermined length and the base sequence being incapable of ligation to each other, wherein the contacting is carried out in the presence of ligase under conditions to ligate to the double-stranded portion of each DNA the probe bearing the base sequence complementary to the single-stranded DNA adjacent the double-stranded portion thereby to form an extended double-stranded portion which is incapable of ligation to further probes (Figures 4 and 5 and Claims 16 a to 16 d and Claims 20 a to 20 d);

c) removing all unligated probes (Claims 16 e and 20 e); followed by the steps of :

(d) cleaving the ligated probes to release each label (Figures 3a, 3b and 4, and Page 16, lines 5-18 and Example 18);

(e) recording the quantity of each label (Example 19, Figures 3b, 4 and 5 and claims 16 f and 20 f); and

(f) activating the extended double-stranded portion to enable ligation thereto (Page 16, lines 15-18, Figures 4 and 5);

(g) steps (b) to (f) are repeated in a cycle for a sufficient number of times to determine the sequence of each single-stranded DNA by determining the sequence of release of each label (Figure 4 and page 16, lines 19-26 and claim 17).

Southern et al. teaches a method wherein the array comprises a plurality of sub-arrays which together contains all possible base sequences (Page 17, line 1 to page 18, line 5 and page 19, line 26 to page 21, lines 23 and claim 20).

Southern et al. teaches a method wherein the initial DNA sample is cut into fragments, each having a sticky end of known length and unknown sequence, which fragments are sorted into subpopulations according to their sticky end sequence (Example 16 b).

Southern et al. teaches a method wherein each single-stranded DNA is immobilized at one end (Figures 4 and 5).

Southern et al. teaches a method wherein the label of each probe comprises a mass label, and the quantity of each label is recorded using mass spectrometry after release of the label (Example 19).

Southern et al. teaches a method wherein the known base sequence is blocked at its 3' OH (Figure 4, step 1).

Southern et al. teaches a method wherein the step of cleaving the ligated probes to release each label unblocks the 3' -OH of the extended double-stranded portion (Figure 4, step 2).

Southern et al. teaches a method wherein the label of each probe is cleavably attached to the 3'-OH of the base sequence (Figure 4).

Southern et al. teaches a method wherein the base sequence of each probe is unphosphorylated at both 3' and 5' ends and comprises phosphorylating the 5'-OH of the extended double-stranded position (Figure 4, steps 3 and 4).

Southern et al. teaches a method wherein the predetermined length of the base sequence is from 2 to 6 (Page 2, lines 2-8).

5. Claims 21-25 and 27-32 are rejected under 35 U.S.C. 102 (a) as anticipated by Macevicz et al. (PCT International Publication Number: WO 96/33205) (October 24, 1996).

Macevicz et al. teaches a method for sequencing DNA (Abstract with Figure), which comprises:

(a) obtaining a target DNA population comprising a plurality of single-stranded DNAs to be sequenced, each of which is inherently present in a unique amount in the same reaction zone and bears a primer to provide a double-stranded portion of the DNA for ligation thereto(Figure 1 and page 10, lines 16 to page 11, lines 23);

(b) contacting the DNA population with an array of hybridization probes, each probe comprising a label cleavably attached to a known base sequence of predetermined length, the array containing all possible base sequences of that predetermined length and the base sequence being

incapable of ligation to each other, wherein the contacting is carried out in the presence of ligase under conditions to ligate to the double-stranded portion of each DNA the probe bearing the base sequence complementary to the single-stranded DNA adjacent the double-stranded portion thereby to form an extended double-stranded portion which is incapable of ligation to further probes (Figures 1-4 and Claim 13);

c) removing all unligated probes (Claim 13); followed by the steps of :

(d) cleaving the ligated probes to release each label (Figures 1-4);

(e) recording the quantity of each label (Example 1, page 21, lines 19-27); and

(f) activating the extended double-stranded portion to enable ligation thereto (Figures 1-4 and Example 1, page 21, last paragraph);

(g) steps (b) to (f) are repeated in a cycle for a sufficient number of times to determine the sequence of each single-stranded DNA by determining the sequence of release of each label (Figures 1-4 and Example 1, page 21, last paragraph).

Macevicz et al. teaches a method wherein the array comprises a plurality of sub-arrays which together contains all possible base sequences (Example 1).

Macevicz et al. teaches a method wherein the initial DNA sample is cut into fragments, each having a sticky end of known length and unknown sequence, which fragments are sorted into subpopulations according to their sticky end sequence (page 5, line 25 to page 6, line 18).

Macevicz et al. teaches a method wherein each single-stranded DNA is immobilized at one end (Figures 1-4).

Macevicz et al. teaches a method wherein the known base sequence is blocked at its 3' OH (Figure 4, step 2).

Macevicz et al. teaches a method wherein the step of cleaving the ligated probes to release each label unblocks the 3' -OH of the extended double-stranded portion (Figure 4, step 3).

Macevicz et al. teaches a method wherein the label of each probe is cleavably attached to the 3'-OH of the base sequence (Figure 4, steps 4 and 5).

Macevicz et al. teaches a method wherein the base sequence of each probe is unphosphorylated at both 3' and 5' ends and comprises phosphorylating the 5'-OH of the extended double-stranded position (Figures 2 and 3b).

Macevicz et al. teaches a method wherein the predetermined length of the base sequence is from 2 to 6 (Page 7, lines 7-20).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103© and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 21-39 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Southern et al. (PCT International Publication Number: WO 95/04160) (February 9, 1995) in view of Stratagene Catalog (1988, page 39).

Southern et al teaches the method of claims of 1-12 including array of hybridization probes comprising mass labels as described above.

Southern et al does not teach the motivation to combine all the reagents for identifying a base at a target position in a single-stranded sample DNA sequence in the form of a kit.

Stratagene catalog teaches a motivation to combine reagents into kit format (page 39).

It would have been *prima facie* obvious to one having ordinary skill in the art at the time the invention was made to combine all the reagents e.g., array of hybridization probes comprising mass labels etc. into a kit format as discussed by Stratagene catalog since the Stratagene catalog teaches a motivation for combining reagents of use in an assay into a kit, "Each kit provides two services: 1) a variety of different reagents have been assembled and pre-mixed specifically for a defined set

of experiments. Thus one need not purchase gram quantities of 10 different reagents, each of which is needed in only microgram amounts, when beginning a series of experiments. When one considers all of the unused chemicals that typically accumulate in weighing rooms, desiccators, and freezers, one quickly realizes that it is actually far more expensive for a small number of users to prepare most buffer solutions from the basic reagents. Stratagene provides only the quantities you will actually need, premixed and tested. In actuality, the kit format saves money and resources for everyone by dramatically reducing waste. 2) The other service provided in a kit is quality control". (page 39, column 1).

Response to Amendment

8. The amendment filed on October 12, 2000 is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure of claims 33, 36, 41-43. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: No kit with plurality of DNA templates, each present in unique amount in the same reaction zone with a means for resolving a measured quantity of hybridized probe by computer program with an algorithm.

Applicant is required to cancel the new matter and claims in the reply to this Office action.

Response to Arguments

9. Applicant's arguments with respect to all pending claims have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Arun Chakrabarti, Ph.D. whose telephone number is (703) 306-5818. The examiner can normally be reached on 7:00 AM-4:30 PM from Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gary Jones, can be reached on (703) 308-1152. The fax phone number for this Group is (703) 305-7401.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0196.

Arun Chakrabarti,

Patent Examiner,

November 1, 2000

W. Gary Jones
Supervisory Patent Examiner
Technology Center 1600